

September 14, 1995

Determination of Switch Cost per Subscriber Various Switch Types and Sizes

Methodology

Cost data was obtained from two sources. For the AT&T and Nortel (Northern Telecom) switches, recent manufacturer's quotations for actual systems were used. In all cases, one of the switches quoted was ordered. Some switches are currently operational, and others are being installed at this time. These costs include Category 3 switching investment and some minor ancillary costs such as power equipment and distributing frames.

For the Redcom switches, actual installed Category 3 switching cost was utilized. Cost of power and distributing frames was not included. Although this creates a slight discrepancy between the switch types in a comparison, it is felt that the differences are not material. In any case, excluding the power and distributing frame cost for the Redcom switches would tend to lower the cost per customer (access line) vs. a cost including these items. This would tend to bias the results in favor of the smaller switch cost per access line being lower than the large switch cost per access line.

Switch costs were utilized to calculate a price formula of $A+Bx$, where:

A = The initial cost of a switch with no line circuits. This is the cost of the call processors, switching matrix, man-machine interface, billing equipment, SS7 interfaces, etc. This can be thought of as the "non-traffic sensitive" or "fixed" portion of a switch in that it is not dependent on the number of access lines served from the switch.

B = The cost per access line installed in the switch

x = The number of access lines installed in the switch.

This formula can be utilized to calculate a price for a switch of any line size. This is a standard formula utilized by switch vendors, service providers, and consultants in the telecommunications industry to calculate budgetary pricing of switches.

The values of A and B were calculated for each switch vendor and switch type. Actual costs used in calculating the formula values are shown on the attachments Switch Prices Based on Recent Vendor Quotations for the AT&T and Nortel switches, and on Switch Prices Based on Actual Cost of Recent Installations for the Redcom switches.

The formulae with the calculated A and B values were then used to determine the budgetary price of each switch type for various standard sizes. The results of the calculations are shown on the attachment Calculated Switch Prices, Various Switch Sizes and Types.

Results

From Calculated Switch Prices, Various Switch Sizes and Types, it can be seen that the cost per access line, and thus the cost per customer, is higher for the smaller switch sizes within a given switch type than for larger switch sizes.

Generally, for smaller switches, costs are higher per customer than for larger switches.

The one exception to this is that the cost of the DMS 10 and 5 ESS CDX in the 10,000 line size are lower than costs for the DMS 100 and AT&T 5 ESS in the 10,000 line size. This is because the DMS 10 and 5 ESS CDX are designed to have a maximum size in the 10,000 line range. The non traffic sensitive (fixed) portion of the DMS 10 and 5 ESS CDX switches are designed to accommodate this maximum size. The DMS 100 and 5 ESS are designed for maximum sizes above 50,000 lines. The fixed cost of the non-traffic sensitive portions of the DMS 100 and 5 ESS required to provide call handling for 50,000 plus lines is greater than the fixed cost for the DMS 10 and 5 ESS CDX. When this larger fixed cost is spread over the same number of lines as the lower fixed cost of the small switches, the cost per access line is greater in the larger switches at the same line size.

The advantage of having several switch sizes available is that telecommunications providers are able to purchase the switch that is most economical in a given size installation, rather than using an uneconomical "one size fits all" philosophy, where all switches, regardless of size, would deploy large size fixed cost processors. In smaller applications, this would result in unused capacity, that would still have to be paid for.

Conclusion and Recommendation

From the calculated prices of the switches, it can be seen that the cost per customer of a small switch is greater than the cost per customer of a large switch. Some form of DEM weighting should be maintained to recognize this situation and adequately compensate owners of smaller size switches.

03/17/97

I:\JACKATADEMSWHIST1.WK4
swhist

**SWITCH PRICES BASED ON RECENT VENDOR QUOTATIONS
VARIOUS SWITCH SIZES AND TYPES**

OFFICE	SWITCH	DATE OF QUOTE	LINES	BASE COST	FEATURES	COST	TOTAL COST	COST PER AL
Y	VENDOR A LARGE SWITCH	1994	5,376	\$1,244,683	ISDN SS7/CLASS	\$120,643 INCL	\$1,365,326	\$254
	VENDOR B LARGE SWITCH	1994	4,830	\$1,897,362	ISDN ODS SS7/CLASS	\$356,650 \$61,601 INCL	\$2,315,613	\$479
	VENDOR C SMALL SWITCH	1993	1,037	\$312,265	ISDN SS7/CLASS	N/A \$83,768	\$396,033	\$382
G	VENDOR D SMALL SWITCH	1993	1,536	\$536,280	ISDN SS7/CLASS	\$46,620 \$20,000	\$602,900	\$393
	VENDOR C SMALL SWITCH	1995	360	\$509,650	SS7/CLASS ISDN		\$509,650	\$1,416
AG	VENDOR D SMALL SWITCH	1995	360	\$345,000	SWITCHES BELOW INCLUDE THE FOLLOWING:		\$345,000	\$958
	VENDOR C SMALL SWITCH	1995	2,800	\$657,240	TR-08 SPARES AIN		\$657,240	\$235
AJ	VENDOR D SMALL SWITCH	1995	2,800	\$785,000			\$785,000	\$280
	VENDOR C SMALL SWITCH	1995	1,130	\$562,000			\$562,000	\$497
BA	VENDOR D SMALL SWITCH	1995	1,130	\$450,000			\$450,000	\$398
	VENDOR C SMALL SWITCH	1995	525	\$553,630			\$553,630	\$1,055
SE	VENDOR D SMALL SWITCH	1995	525	\$355,000			\$355,000	\$676
	VENDOR C SMALL SWITCH	1995	700	\$565,100			\$565,100	\$807
SA	VENDOR D SMALL SWITCH	1995	700	\$400,000			\$400,000	\$571

03/17/97

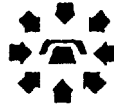
**SWITCH PRICES BASED ON ACTUAL COST OF RECENT INSTALLATIONS
VARIOUS SWITCH SIZES AND TYPES**

OFFICE	SWITCH	DATE OF QUOTE	LINES	BASE COST	FEATURES	COST	TOTAL COST	COST PER AL
TE	VENDOR E		4	\$34,636			\$34,636	\$8,659
BI	VENDOR E		9	\$22,675			\$22,675	\$2,519
LI	VENDOR E		9	\$51,002			\$51,002	\$5,667
ST	VENDOR E		13	\$39,619			\$39,619	\$3,048
LA	VENDOR E		16	\$36,598			\$36,598	\$2,287
CH	VENDOR E		18	\$50,099			\$50,099	\$2,783
TA	VENDOR E		19	\$42,411			\$42,411	\$2,232
PL	VENDOR E		22	\$26,561			\$26,561	\$1,207
RA	VENDOR E		22	\$38,791			\$38,791	\$1,763
TW	VENDOR E		23	\$35,970			\$35,970	\$1,564
AR	VENDOR E		27	\$71,682			\$71,682	\$2,655
CH	VENDOR E		29	\$23,648			\$23,648	\$815
BE	VENDOR E		29	\$69,303			\$69,303	\$2,390
NI	VENDOR E		31	\$73,208			\$73,208	\$2,362
SH	VENDOR E		35	\$74,497			\$74,497	\$2,128
NI	VENDOR E		37	\$44,602			\$44,602	\$1,205
MI	VENDOR E		39	\$55,580			\$55,580	\$1,425
CH	VENDOR E		44	\$36,018			\$36,018	\$819
VE	VENDOR E		44	\$53,105			\$53,105	\$1,207
NE	VENDOR E		45	\$56,384			\$56,384	\$1,253
TU	VENDOR E		47	\$54,023			\$54,023	\$1,149
GO	VENDOR E		50	\$99,116			\$99,116	\$1,982
AT	VENDOR E		56	\$71,418			\$71,418	\$1,275
CH	VENDOR E		57	\$71,744			\$71,744	\$1,259
KO	VENDOR E		59	\$50,019			\$50,019	\$848
NA	VENDOR E		59	\$103,523			\$103,523	\$1,755
AK	VENDOR E		61	\$68,470			\$68,470	\$1,122
MA	VENDOR E		62	\$98,643			\$98,643	\$1,591
CE	VENDOR E		62	\$122,343			\$122,343	\$1,973
RU	VENDOR E		63	\$75,941			\$75,941	\$1,205
NA	VENDOR E		64	\$71,354			\$71,354	\$1,115
TU	VENDOR E		69	\$50,968			\$50,968	\$739
EE	VENDOR E		70	\$97,778			\$97,778	\$1,397
ME	VENDOR E		71	\$106,908			\$106,908	\$1,506
MA	VENDOR E		74	\$84,476			\$84,476	\$1,142

03/17/97

**SWITCH PRICES BASED ON ACTUAL COST OF RECENT INSTALLATIONS
VARIOUS SWITCH SIZES AND TYPES**

OFFICE	SWITCH	DATE OF QUOTE	LINES	BASE COST	FEATURES	COST	TOTAL COST	COST PER AL
SC	VENDOR E		75	\$111,209			\$111,209	\$1,483
NU	VENDOR E		81	\$81,093			\$81,093	\$1,001
TU	VENDOR E		86	\$104,618			\$104,618	\$1,216
KO	VENDOR E		88	\$103,864			\$103,864	\$1,180
KW	VENDOR E		89	\$68,573			\$68,573	\$770
AL	VENDOR E		92	\$137,169			\$137,169	\$1,491
AK	VENDOR E		94	\$124,724			\$124,724	\$1,327
PI	VENDOR E		98	\$131,022			\$131,022	\$1,337
KA	VENDOR E		101	\$131,818			\$131,818	\$1,305
TO	VENDOR E		102	\$109,000			\$109,000	\$1,069
CH	VENDOR E		110	\$123,673			\$123,673	\$1,124
KW	VENDOR E		112	\$113,133			\$113,133	\$1,010
QU	VENDOR E		115	\$152,083			\$152,083	\$1,322
SA	VENDOR E		120	\$136,542			\$136,542	\$1,138
HO	VENDOR E		121	\$156,077			\$156,077	\$1,290
GA	VENDOR E		122	\$143,045			\$143,045	\$1,173
KI	VENDOR E		133	\$138,720			\$138,720	\$1,043
EM	VENDOR E		173	\$195,938			\$195,938	\$1,133
TO	VENDOR E		180	\$164,382			\$164,382	\$913
MT	VENDOR E		190	\$191,964			\$191,964	\$1,010
ST	VENDOR E		213	\$229,807			\$229,807	\$1,079

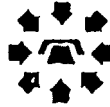


National Summary Data

Subscribers Per Study Area	Dial Equipment Minutes Per Loop	Gross Switch Investment Per Loop	Gross Switch Investment Per Thousand Minutes	Switch Rev. Req. Per Loop	Switch Rev. Req. Per Thousand Minutes
Under 500 Subscribers	13,133	1,164.14	88.64	430.78	32.80
500 to 1,000 Subscribers	14,075	755.49	53.68	277.64	19.73
1,000 to 2,000 Subscribers	12,916	660.29	51.12	222.06	17.19
2,000 to 5,000 Subscribers	13,526	588.08	43.48	186.92	13.82
5,000 to 10,000 Subscribers	14,379	529.84	36.85	166.47	11.58
10,000 to 20,000 Subscribers	15,381	535.74	34.83	168.03	10.92
20,000 to 50,000 Subscribers	16,959	476.90	28.12	149.33	8.80
50,000 to 100,000 Subscribers	16,087	482.42	29.99	152.18	9.46
100,000 to 200,000 Subscribers	16,283	500.60	30.74	156.17	9.59
200,000 to 500,000 Subscribers	16,556	455.37	27.50	135.94	8.21
500,000 to 1,000,000 Subscribers	17,682	440.25	24.90	132.53	7.50
Over 1,000,000 Subscribers	19,199	367.93	19.16	116.47	6.07
Total	18,672	389.74	20.87	122.21	6.54

ATA Comments 80-286 NECA & FCC Sources

GVNW Inc./management

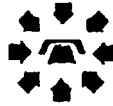


National Summary Data

Subscribers per Switch	Number of Switches	Number of Subscribers	Average Subs. per Switch	Switch Gross Cost Loop	Switch Gross Cost per Subscriber	Switch Revenue Requirement	Switch Revenue Requirement per Subscriber
Less than 100	96	6,773	71	10,605,864	1,565.90	3,773,745	557.17
100 to 199	156	25,853	166	30,182,528	1,167.47	10,099,159	390.64
200 to 499	1,181	385,612	327	326,063,417	845.57	94,213,016	244.32
500 to 999	5,859	4,394,889	750	2,159,544,365	491.38	654,241,219	148.86
1,000 to 1,999	4,319	6,258,969	1,449	2,984,442,259	476.83	911,484,384	145.63
2,000 to 4,999	4,138	12,563,579	3,036	6,165,482,731	490.74	1,837,478,089	146.25
5,000 to 9,999	3,679	27,354,651	7,435	11,164,844,111	408.15	3,398,889,574	124.25
Over 10,000	5,732	78,801,536	13,748	28,274,999,934	358.81	9,193,435,365	116.67
Total	25,160	129,791,862	5,159	51,116,165,209	393.83	16,103,614,551	124.07

ATA Comments 80-286 NECA & FCC Sources

GVNW Inc./management



Calculated Switch Prices Various Switch Sizes and Types

<u>Switch Vendor</u>	<u>Switch Type</u>	<u>Access lines</u>	<u>Calculated Cost A+Bx</u>	<u>Calculated Cost Per Access Line</u>
Vendor A	Large Switch	1,000	\$ 752,686	\$ 752.69
		10,000	\$2,012,686	\$ 201.27
		20,000	\$3,412,686	\$ 170.63
		50,000	\$7,612,686	\$ 152.25
Vendor B	Large Switch	1,000	\$2,047,513	\$2,047.71
		10,000	\$2,677,513	\$ 267.75
		20,000	\$3,377,513	\$ 168.88
		50,000	\$5,477,513	\$ 109.55

ATA Comments 80-286



Calculated Switch Prices Various Switch Sizes and Types (Con't)

Vendor C	Small Switch	1,000	\$ 553,162	\$ 553.16
		10,000	\$1,822,278	\$ 116.50
Vendor D	Small Switch	1,000	\$ 525,680	\$ 525.68
		10,000	\$1,165,045	\$ 182.23
Vendor E	Small Rural	100	\$ 117,689	\$1,176.89
		384	\$ 386,069	\$1,005.39

ATA Comments 80-286

GVNW Inc./management

Attachment 15

COMPANY	% Equity	% Debt
Citizens Telephone	88%	12%
Ayrshire	47%	53%
Rural Telephone	79%	21%
Albion Telephone	61%	39%
Trans-Cascade	55%	45%
Dell City - Texas	37%	63%
Churchill	100%	0%
Siskiyou	52%	48%
Range	37%	63%
Nehalem	44%	55%
Beaver Creek	40%	60%
Clear Creek	40%	60%
Clark Fork	14%	86%
Blackfoot	62%	38%
Interior	32%	68%
Mukluk	35%	65%
AVERAGE	51%	49%

DOCUMENT OFF-LINE

This page has been substituted for one of the following:

- o An oversize page or document (such as a map) which was too large to be scanned into the RIPS system.

- o Microfilm, microform, certain photographs or videotape.

- o Other materials which, for one reason or another, could not be scanned into the RIPS system.

The actual document, page(s) or materials may be reviewed by contacting an Information Technician. Please note the applicable docket or rulemaking number, document type and any other relevant information about the document in order to ensure speedy retrieval by the Information Technician.

1 Diskette